

Armour School

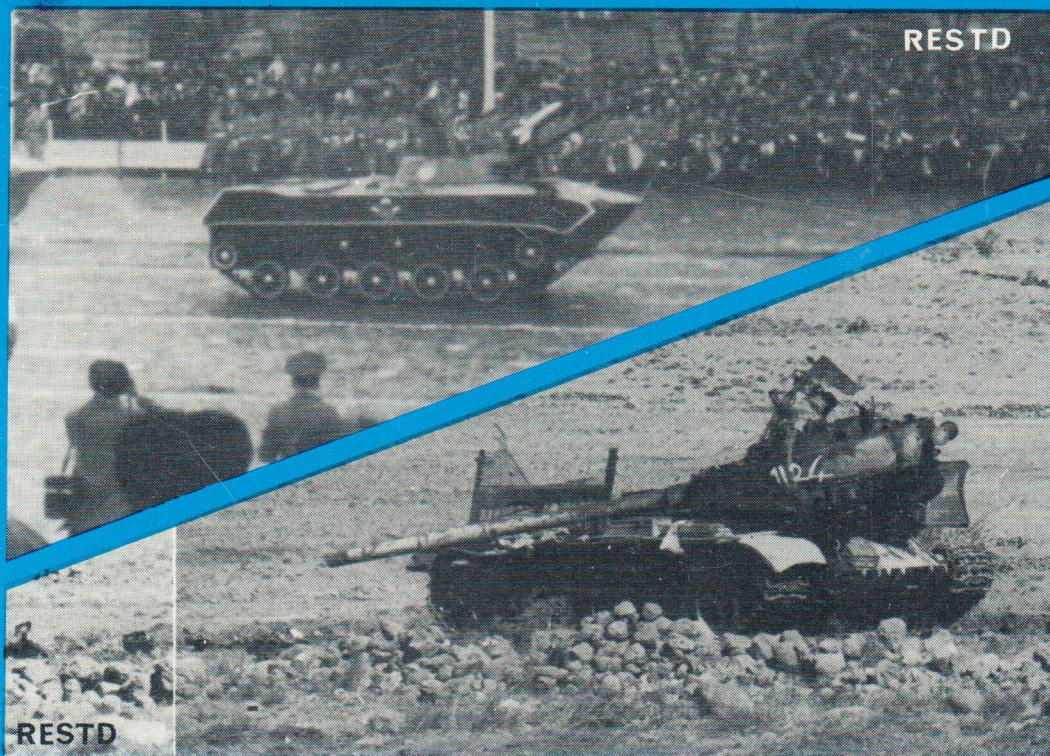
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PART II

MOSCOW PARADE NOVEMBER 1973

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Cover Picture BMD on Moscow Parade and
T.62 knocked out on Golan Heights

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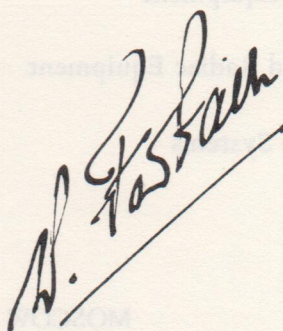
ARMY TECHNICAL INTELLIGENCE REVIEW No 105 (RESTRICTED)

FOREWORD

The last six months have been particularly eventful in the technical intelligence world. There have been two events of major importance to us, the Arab/Israeli War and the November Parade in Moscow, so we have devoted the whole of this issue to these two subjects.

In Part I we have identified the more important Warsaw Pact equipments that were used during the war and reminded you of their main characteristics as well as commenting on reports of their performance. No attempt can be made at this early stage to draw any lessons from the war and I have therefore restricted the scope of the articles accordingly. Perhaps by the next issue we will be in a position to make more constructive comment.

The Moscow Parade was particularly revealing, as we at last learned the true identity of the Light Tank M-1970. It turned out to be BMD, a smaller airdroppable version of BMP. Also of interest were the appearance of the SWATTER ATGW in a new vehicle configuration and the fitting of an AA machine gun to yet another armoured vehicle, this time the ASU-85.



W A H FAIRBAIRN

Colonel

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PART I

USE OF WARSAW PACT EQUIPMENT

IN

ARAB/ISRAELI WAR 1973




I. Soviet Armour

The AFVs available to the Egyptians and Syrian armies at the outset of war ranged from the obsolescent T-34/85 to the latest of the Soviet Medium Battle tanks, the T-62. A greater number of the older equipments appeared in press and television coverage of the Egyptian front, whilst the T-62 featured prominently in the earliest Golan Height coverage. This suggests that the Syrian Army started the war with a more modern tank fleet than the Egyptians. However although the proportions may have varied, most AFVs were common to both fronts and all were used in battle at one time or another.

Captured Soviet tanks were also used by the Israelis who had units equipped with T-54/55. Some of these had been upgunned with the UK 105mm gun (Remember quiz photo No 4 in the last issue) and in the later stages of the war they also used freshly captured T-62s. One newspaper reported that it took only twenty minutes for an Israeli tank crew to adapt to the Soviet tanks.

The T-34/85, although possibly the best tank of its day, must now be considered relatively ineffective against modern medium tanks. The majority of tanks in both Arab tank fleets consisted of T-54/55 and the APHE round fired by the 100mm gun of this tank is not capable of penetrating the glacis or nose plates of Centurion or the M60 at 1000 metres. Its HEAT round is of course effective against both these tanks. This tank offers both good mobility and a fair level of crew protection and was the tank in which the Arabs had most battle experience.

The newcomer to the battlefield was the T-62 which although automotively very similar to the T-55 is equipped with a 115mm smooth bore gun, firing APDS Fin Stabilized and HEAT Fin Stabilized rounds. The APDS projectile is fired at a muzzle velocity of 1680 metres per second and its penetrative performance is considerably better than the 100mm APHE, it being capable of defeating the frontal armour of all western tanks at 1500 metres. It may be significant that although the presence of this tank received wide press coverage, it was not singled out for mention as being a major factor in any battle. In the absence of any detailed information it appears that the 115mm gun did not significantly increase the Arab capacity. Since we know the penetrative performance is good, this may cast some doubts on the range and accuracy of this gun.

Both the T-54/55 and T-62 have external fuel tanks, and have ammunition stowage contiguous with internal fuel tanks. Battle damage such as is shown in figures 1 and 2 indicates the susceptibility of these tanks to ammunition explosions when hit. The fire risk posed by the external fuel tanks was obviously a cause for some concern, since many tanks were seen in action with these fuel tanks heavily protected by sandbags. (See Fig 3 page 12 in Engr Section).



Results of Ammunition Explosions in T-62 Tanks

The major characteristics of the Soviet equipment used are set out in the table below:

SYRIAN AND EGYPTIAN HOLDINGS

EQUIP	COUNTRY OF ORIGIN	GUN CALIBRE (mm)	MAX EFFECTIVE RANGE (METRES)	AMMUNITION (Note 1)	REMARKS
T-34/85	USSR	85	1000	APHE, HVAP	Smooth bore gun, all ammo is Fin stabilised.
T-54/55	USSR	100	1500 (2)	APHE, HEAT	
T-62	USSR	115	1500-2000(2)	APDS, HEAT	
JSU 122	USSR	122	900	APHE, HEAT	Not held by Syria.
SU-100	USSR	100	1000 (est)	APHE, HEAT	

Note 1: Only direct fire anti-tank natures listed.

2: Estimated max effective ranges. Normal Soviet practice is to engage at ranges between 1000-1500 metres.

2. Artillery

Field Artillery. The two largest calibre field artillery weapons which the Arab Armies have in service are:

- a. Soviet 130mm field gun M-46 (Fig 1) which has a maximum range of 27,000m. The M-46 is the gun which was used so successfully by the North Vietnamese in their 1972 offensive.
- b. Soviet 203mm Gun/Howitzer M-1955 (Fig 2) which has an estimated range of 29,000m.

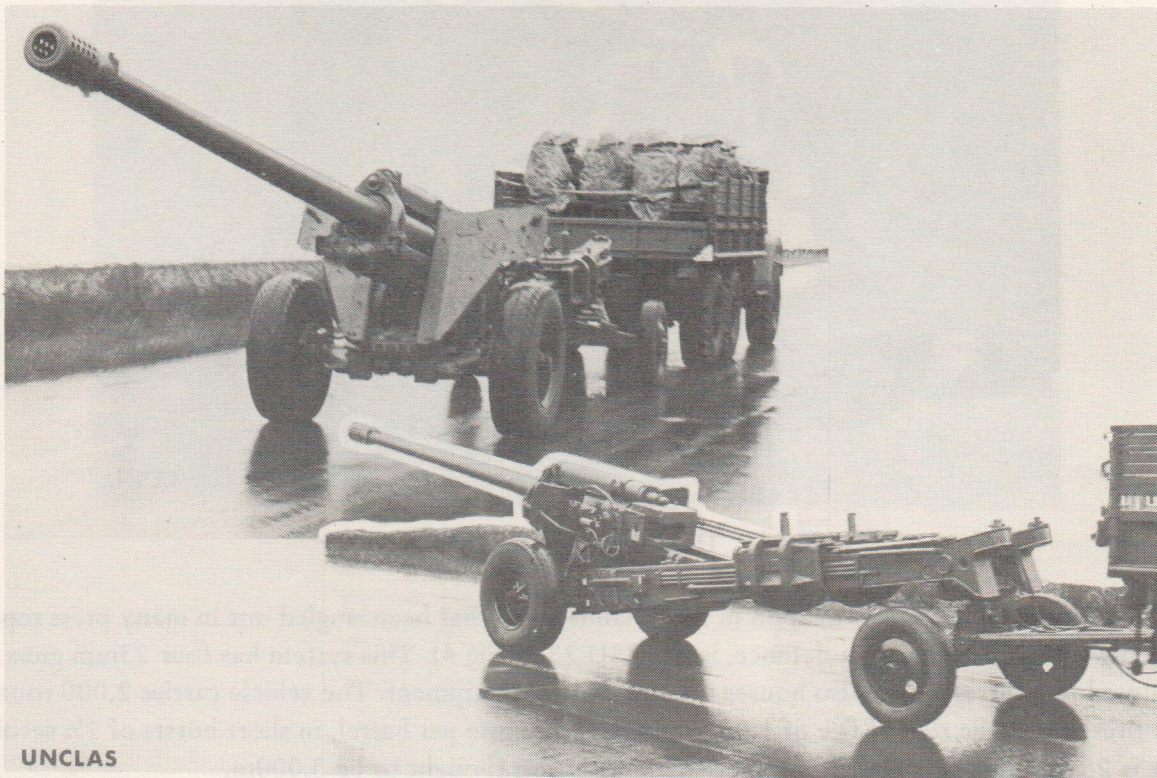


Fig 1. 130mm Field Gun M-46

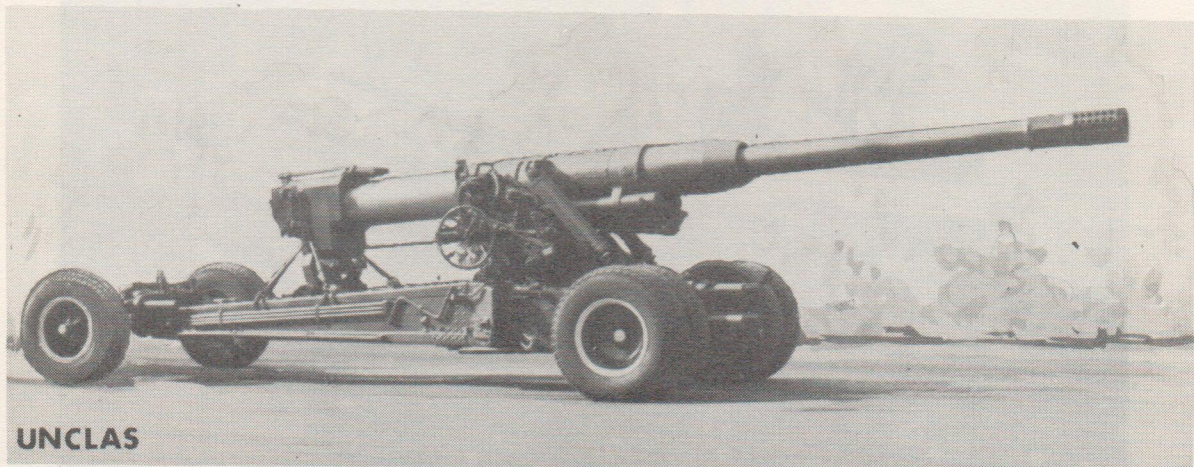


Fig 2. 203mm Gun/Howitzer M-1955

Syrian SP Gun. It is interesting to see how the Syrians have attempted to produce for themselves a self propelled gun by mounting a 122mm howitzer D-30 on a T-34 tank chassis (Fig 3). The D-30 normally fires HE and Smoke to a maximum range of 15,300m. This SP does not offer any of the crew protection expected of an SP gun, except for the shield; and loading and laying must be difficult on the uneven deck of the T-34.



Fig 3. D-30 mounted on T-34 Tank

Air Defence Guns. The weapon in Arab hands which has been singled out in many press reports as being very effective for air defence, is the ZSU-23-4 (Fig 4). This system has four 23mm guns mounted in a turret which also houses the fire control equipment. The vehicle carries 2,000 rounds and fires at a cyclic rate of fire of 1,000 rounds per minute per barrel, in short bursts of 1½ seconds, that is 25 rounds per barrel. The effective slant range is thought to be 3,000m.



Fig 4. ZSU-23-4

3. Infantry Weapons & APCs

INFANTRY WEAPONS

There is not a lot of information available on which infantry weapons were employed during the recent conflict. However with the information which is available and some surmising a picture of sorts can be put together.

The personal weapon of the Egyptian and Syrian soldiers would certainly have been the Kalashnikov Assault Rifle, but the model (AK-47 or AKM (Fig 1)) is not known. This is of little consequence as the performance of both models is the same, but the construction and thus the weights differ.

Calibre	—	7.62mm
Practical Range	—	400m
Rates of Fire	—	600/100/40 rpm (Cyclic/Automatic/Semi-Automatic)
Weight (empty)	—	AK-47 — 3.87kg
	—	AKM — 2.93kg



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Fig 1. AKM

Among the captured weapons there appeared the latest known model of the Soviet PK series General Purpose Machine Gun, known as PKMB (Fig 2). The PK has a fluted barrel and machined receiver, but the PKMB is fitted with a smooth barrel and, as is now the trend in USSR, a stamped receiver. The latter feature would lighten the weapon. Another point of difference is the hinged butt rest fitted to the PKMB. Details for the PK are:

Calibre	—	7.62mm
Practical Range	—	1000m
Rates of Fire	—	650/250 rpm (Cyclic/Automatic)
Weight (empty)	—	9kg



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Fig 2. PKMB

Anti-tank hand grenades which were used by Egypt included the Soviet RPG-43 (Fig 3) and RKG-3M (Fig 4). The RPG-43 is a very early model grenade but the RKG-3M is the latest known grenade of its kind in the Soviet Armoury. Each employs the shaped charge principle and is stabilised by a metal or fabric drogue so that when thrown the grenade descends vertically onto the top of the target vehicle. The throwing range is about 20m and the armour penetration is about 75mm for the RPG-43 and 165mm for the RKG-3M.



Fig 3. Anti Tank Hand Grenade RPG-43



Fig 4. Anti Tank Hand Grenade RKG-3M

The RPG-7V shoulder-fired Anti-Tank Grenade Launcher was used by Egypt and was reported to have lived up to its reputation as an effective anti-tank weapon. It had been suspected that the Soviets used a night sight on RPG-7V, but none had been seen until some were displayed by the Israelis as captured equipment (Fig 5). Since it is quite bulky, a bipod has been fitted to the launcher to improve stability. Here are a few characteristics and performance details for RPG-7V to refresh memories.

Calibre, Launcher	—	40mm
Grenade	—	85mm
Weight, Launcher	—	7kg
Grenade	—	2.25kg
Range, Self-destruct	—	920m
Static target	—	500m
Moving target	—	300m
Penetration at 0°	—	320mm

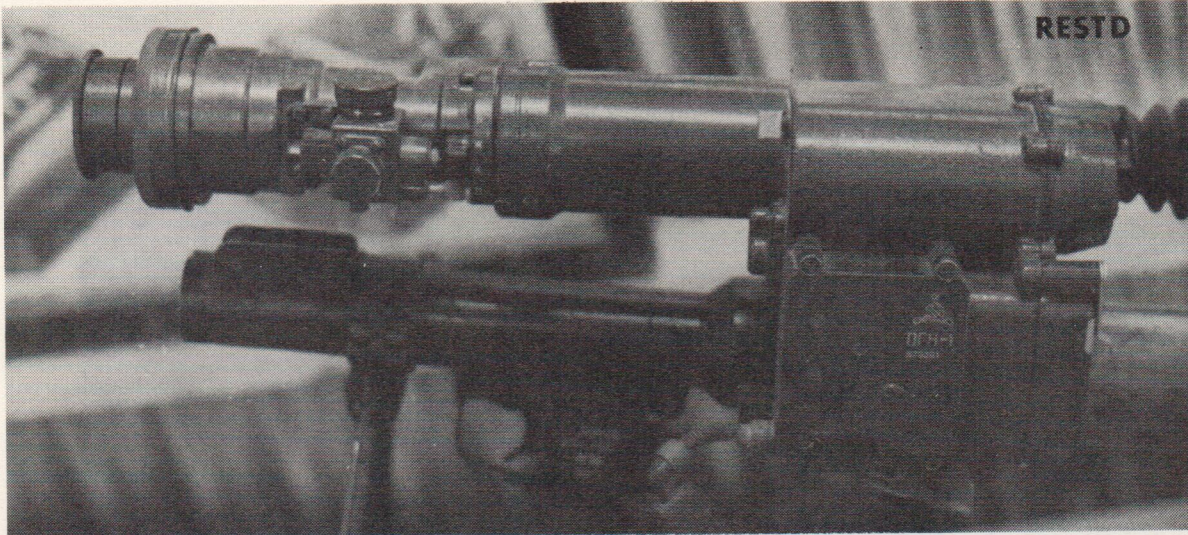


Fig 5. RPG-7V with Night Sight

Readers may have seen in the press a reference to an improved model known as RPG-11. There has been no further information on this and the nomenclature is certainly new to Technical Intelligence (Army).

APCs

Most Readers will have seen from television and newspaper coverage, that such Soviet vehicles as BTR-152 (Fig 6), BTR-50PK (See Fig 1 of Engr Section) and BTR-60PB (Fig 7) were used by the Syrians and Egyptians.



Fig 6.
BTR-152



Fig 7.
BTR-60PB

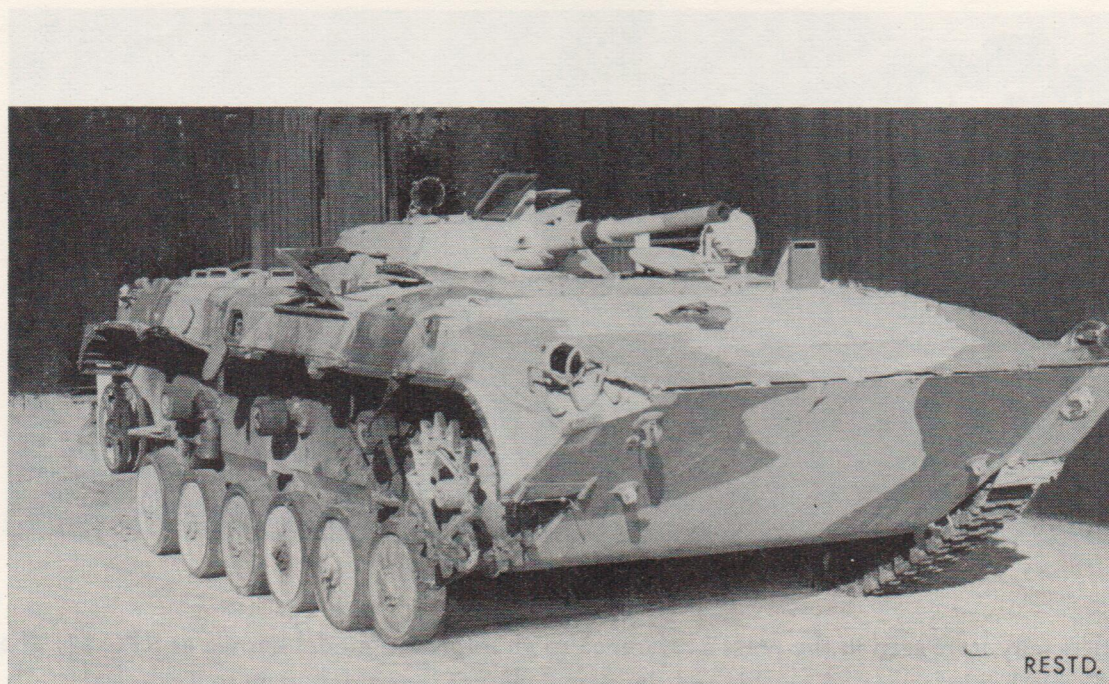


Fig 8. Soviet ICV BMP-A

The best news of all — in the ICV field — was the appearance and capture of the modern Soviet tracked APC, the BMP-A (Fig 8). This was the first appearance of the vehicle outside the Warsaw Pact and probably its baptism under fire. Some details of the vehicles are given in the table.

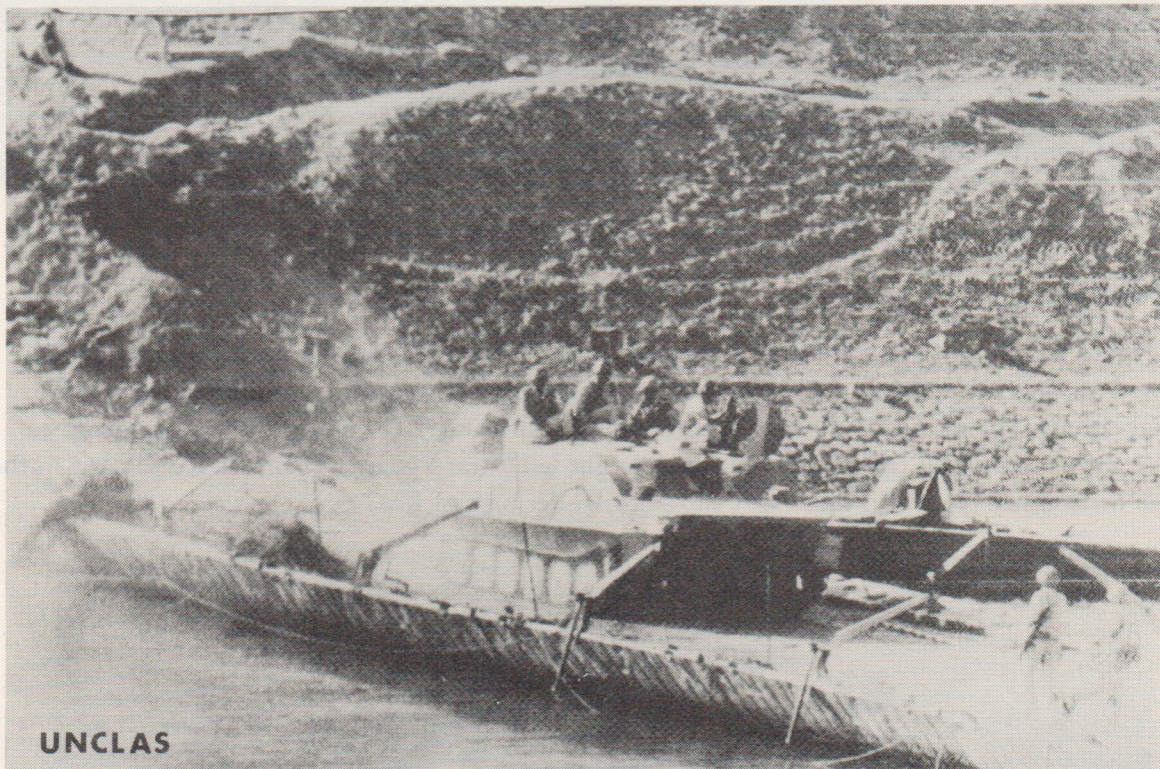
DETAIL	BTR-152	BTR-60PB	BTR-50PK	BMP-A
Weight (tons)	8.95	10.3	14.5	12.5
Engine	110 BHP Petrol, front	2 x 90 BHP Petrol, rear	240 BHP Diesel, rear	280 BHP Diesel, front
Amphibious	No	Yes	Yes	Yes
Speed — Land (kph) Water (kph)	65 —	80 10	44 10	55 8
Armament	7.62mm MG	14.5mm KPVT 7.62mm Co- axial MG	7.62mm MG	73mm Gun SAGGER ATGW 7.62mm Co- axial MG
Crew and Passengers	1 + 18	2 + 8	2 + 20	3 + 8

4. Engineer Equipment

Wet Bridging

The first Warsaw Pact engineer equipment seen in the war was an Egyptian TPP Heavy Pontoon Bridge built across the Suez Canal. This equipment was first produced in 1954 and has a 50 tonne load capacity. The Soviet norm for construction is 2.2 metres per minute and at this rate, the 180 metre wide Canal could be crossed in 82 minutes.

Figure 1 shows an Egyptian BTR-50PK Armoured Personnel Carrier crossing a PMP Heavy Folding Pontoon Bridge over the Canal. This bridge appeared in 1961 replacing TPP in the Soviet inventory. It has a load capacity of 60 tonnes and a normal Soviet construction rate of 7.5 metres per minute.



**Fig 1. BTR-50PK Armoured Personnel Carrier
Crossing PMP Pontoon Bridge**

Also sighted in operation on the Canal was the 5 tonne capacity tracked amphibian K-61.

Among the Egyptian equipment captured by Israel was the GSP Heavy Ferry. This two part tracked amphibian has a 52 tonne capacity and can be used for ferrying tanks and artillery before bridges are built.

Assault Bridging

Captured from Syria were the Czech built 18 metre long tank mounted scissors bridge MT-55 and the 20 metre long Soviet tank mounted, cantilever launched bridge MTU-20 seen in Figure 2.

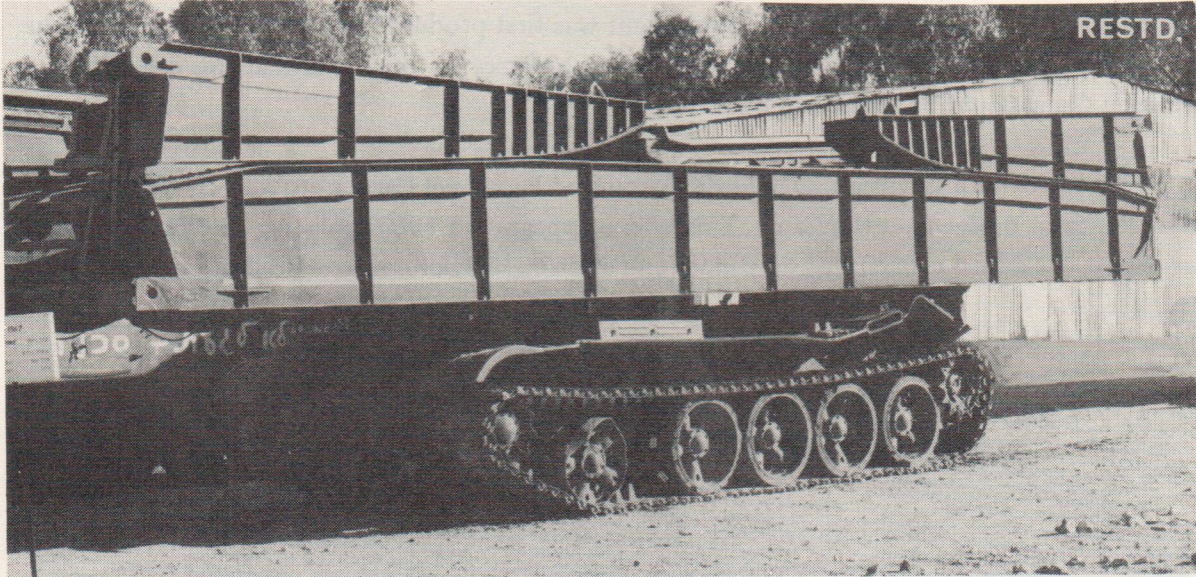


Fig 2. Soviet Cantilever Bridge MTU-20

Mine Clearing

Figure 3 shows a Syrian T-55 medium tank equipped with mine clearing ploughs that was captured on the Golan Heights. The two fittings on the tank's nose plate are for attaching mine clearing rollers. The plough and roller combination is called KMT-5. Note the use of sandbags to protect the external fuel tanks located over the right hand track guard. Their use is discussed in the section on armour. Note also that Fig 1 shows the roller part of KMT-5.



Fig 3. T-55 Tank with Mine Clearing Ploughs

5. Signal Equipment

Several different Soviet radio sets were used by the Arab armies during the Arab/Israeli war 1973. Two of these sets were VHF/FM Radios. The R-123 (Fig 1) is a VHF/FM radio mounted in armoured fighting vehicles. It has an operating range of approximately 35km and a frequency coverage of 20-52 MHz. The R-105 (Fig 2) manpack radio has an operating range of about 8km and a frequency coverage of approximately 35-46 MHz.

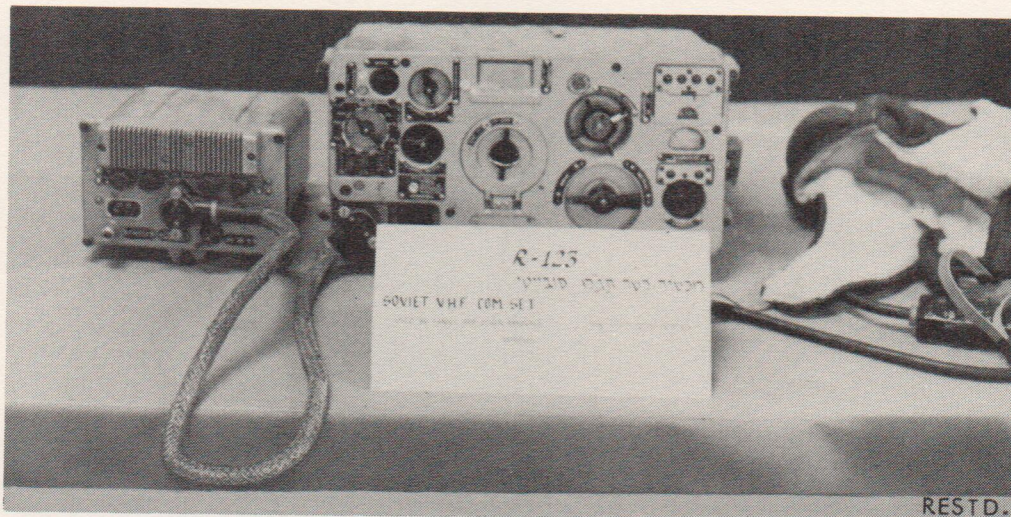


Fig 1. R-123 AFV Radio

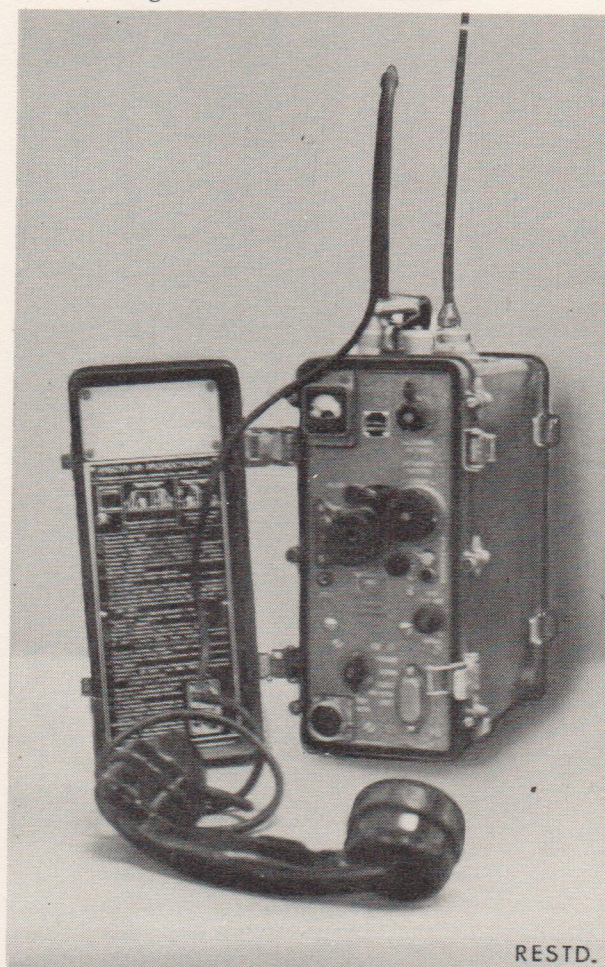


Fig 2. R-105 Manpack Radio

5. Signal Equipment

Several different Soviet radio sets were used by the Arab armies during the Arab-Israeli war 1973. Two of these sets were VHF/FM Radios. The R-123 (Fig 1) is a VHF/FM radio mounted in armoured fighting vehicles. It has an operating range of approximately 35 km and a frequency coverage of 30-52 MHz. The R-102 (Fig 2) manpack radio has an operating range of about 8 km and a frequency coverage of approximately 32-40 MHz.

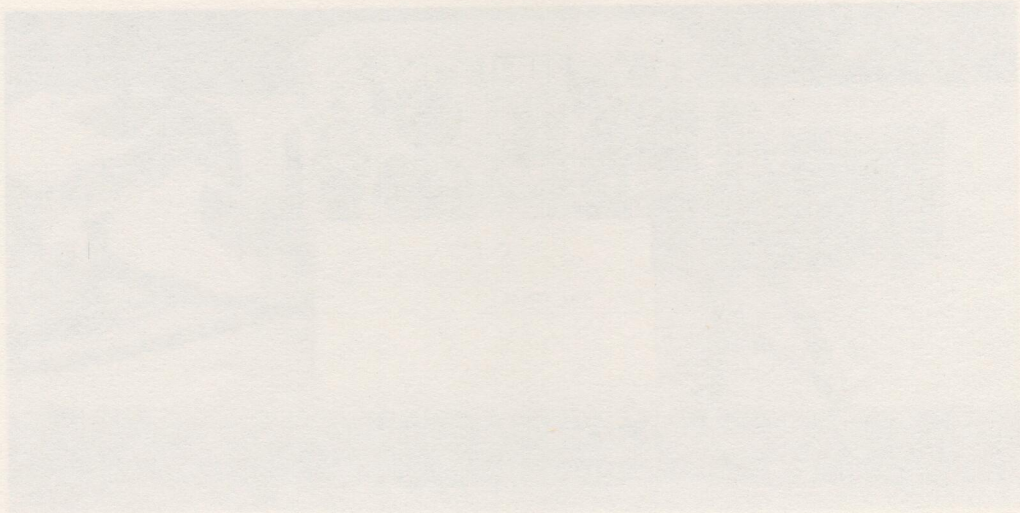


Fig 1 R-123 VHF Radio

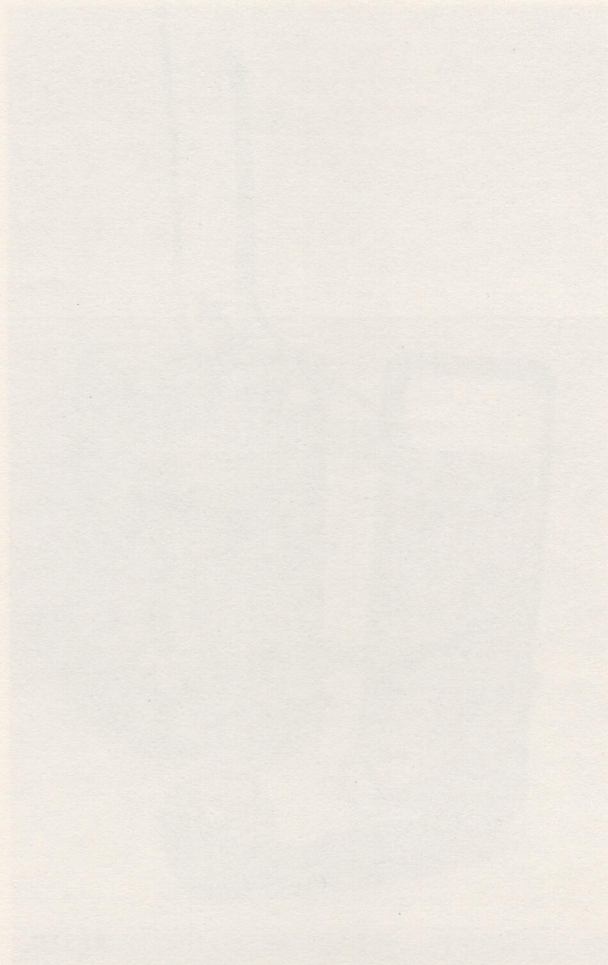


Fig 2 R-102 Manpack Radio

6. CW & Radiac Equipment

Certain Soviet made CW and Radiac defensive equipment captured by the Israeli Army from the Arab armies was shown recently to foreign attaches. Among the items on display were:

- a. The ShLEM Respirator (Fig 1).
- b. Oxygen Regenerating Breathing Apparatus (IP-46M) (Fig 2).
- c. Chemical Agent Detection Equipment.
 - (1) PKhR-54 (Fig 3a).
 - (2) VPKhr (Fig 3b).
 - (3) PPKhR (Fig 4).
- d. Decontamination Equipment.
 - (1) IPP (Fig 5).
 - (2) ADK (Fig 6).
 - (3) DK-4 (Fig 7).
- e. Radiac Equipment.
 - (1) DP-23A (Fig 8).
 - (2) DP-63A (Fig 9a).
 - (3) DP-3 (Fig 9b).
 - (4) DP-5A (Fig 9c).
 - (5) DP-12 (Fig 9d).

THE ShLEM RESPIRATOR (Fig 1)

This mask and its canister have provided the standard respirator for the Soviet forces since 1940. The soft mask fits tightly over the face and head. It is heavy and uncomfortable, particularly in hot weather, has a low visual efficiency and a high breathing resistance.



Fig 1. ShLEM Respirator

OXYGEN REGENERATIVE BREATHING APPARATUS

IP-46M (Fig 2). This is issued to tank crews to provide a means of escape from submerged tanks during schnorkelling operations. Two hours is the operating lifetime of the system.



Fig 2. IP-46M Breathing Apparatus

DETECTION EQUIPMENT

PKhR-54 (Fig 3a). Indicator tubes are used to show the presence of chemical and nerve agents by means of colour changes.

VPKhR (Fig 3b). This is the newest and current standard Soviet chemical agent detection and identification kit. There are only 3 types of detector tubes but like PKhR-54 it can detect most common chemical agents and V-type and G-type nerve agents.



Fig 3. PKhR-54 and VPKhR Detection Kits

PPKhR (Fig 4). The PPKhR semi automatic chemical agent detection and identification kit is used in chemical recce. It has an electrically driven rotary air pump and an electric heater for indicator tubes in order to speed up any colour change.



Fig 4. PPKhR Detection Kit

DECONTAMINATION EQUIPMENT

IPP (Fig 5). This personal decontamination equipment is used to treat small areas of skin and clothing contaminated with chemical or nerve agents or vesicants (blister agents).

Fig 5. IPP Personal Decontamination Kit



ADK (Fig 6). Artillery pieces and large mortars are decontaminated using the ADK equipment. Decontaminant solutions are prepared by mixing 2 re-agents. The solution is poured into the hollow handle of a cleaning brush which is then used to complete the task.

Fig 6. Artillery and Mortar Decontamination Kit

DK-4 (Fig 7). This apparatus is used for the decontamination of vehicles and equipment. Any vehicle with a 4-stroke engine can be adapted to use the DK-4. The exhaust gas is used to operate an aspirator which draws the decontaminant solution from containers to the affected area via a flexible hose and brush.



Fig 7. DK-4 Vehicle Decontamination Kit

INDIVIDUAL DOSIMETER SET

An individual dosimeter is an instrument carried by a person who is likely to be exposed to nuclear radiation.

DP-23A (Fig 8). This is contained in a carrying case and has 200 pocket dosimeters of two types. The DKP-50A is a self reading dosimeter with a range from 0 to 50 rads in 2-rad intervals. The other type, the DS-50 has the same range but must be read in the charger-reader provided.



Fig 8. DP-23A Carrying Case (200 Dosimeters)

DP-63A Lightweight Area Survey Meter (Fig 9a)

The DP-63A lightweight area survey meter is issued to all types of units for field detection of Beta and Gamma radiation. Battery life is 50 hours: two ranges are provided on the scale, 0.1 to 1.5 or 1.5 to 50 rads/h.

DP-3 Radiation Survey Meter (Fig 9b)

The DP-3 is a Gamma detection and measuring device designed for use in large area rapid surveys. Power is provided by a vehicle battery. The device can be mounted in aircraft, ships and motor vehicles but is usually fitted in the radiological/chemical reconnaissance vehicles.

DP-5A Radiation Meter (Fig 9c)

The DP-5A is designed for monitoring water, food supplies and personnel. The meter has 6 different subranges from 0.05 to 200 millirads per hour. Earphones are used as an aid in Beta radiation detection. The sensing element is contained in an extended rod to monitor otherwise inaccessible areas.

DP-12 Contamination Survey Meter (Fig 9d)

The DP-12 is designed primarily for monitoring radio-active contamination of personnel, vehicles and equipment. It is highly sensitive. The probe is a shaft with Geiger-Muller type tube sensitive to Beta and Gamma radiation. During operations, the equipment is carried on the chest so that the wearer can see the control panel.

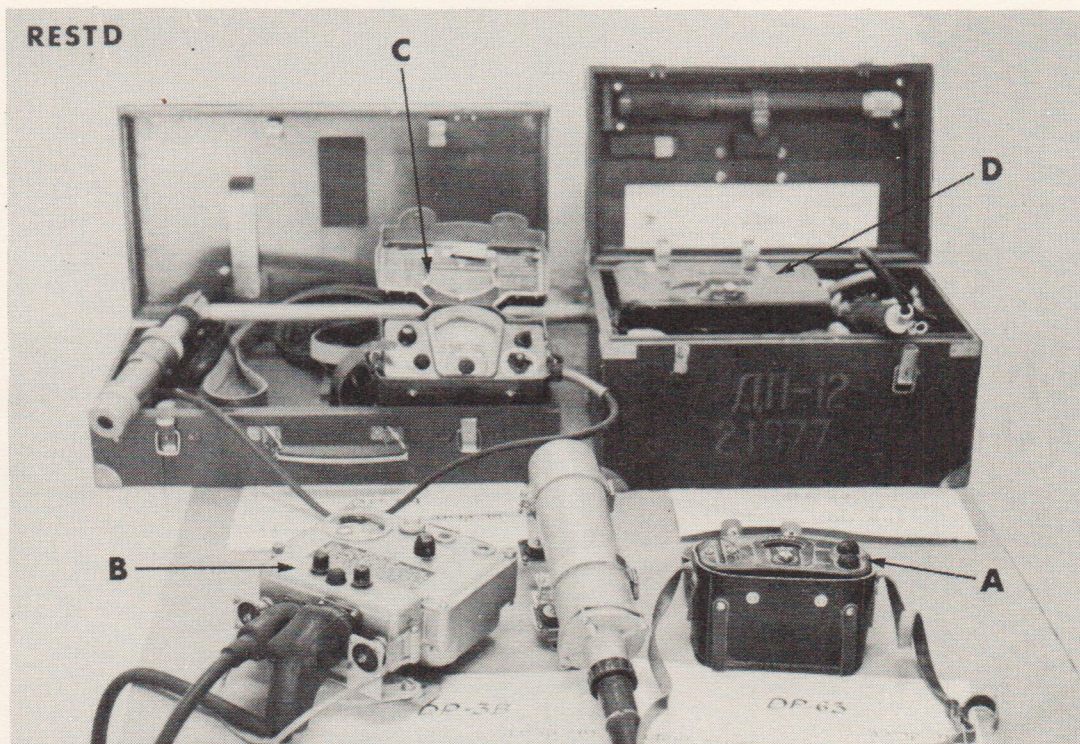


Fig 9. Radiac Instruments — DP-63A, DP-3, DP-5A and DP-12

DP-62A Lightweight Area Survey Meter (Fig. 9a)

The DP-62A lightweight area survey meter is issued to all types of units for field detection of Beta and Gamma radiation. Battery life is 50 hours; two ranges are provided on the scale, 0.1 to 1.5 or 1.5 to 50 rads/h.

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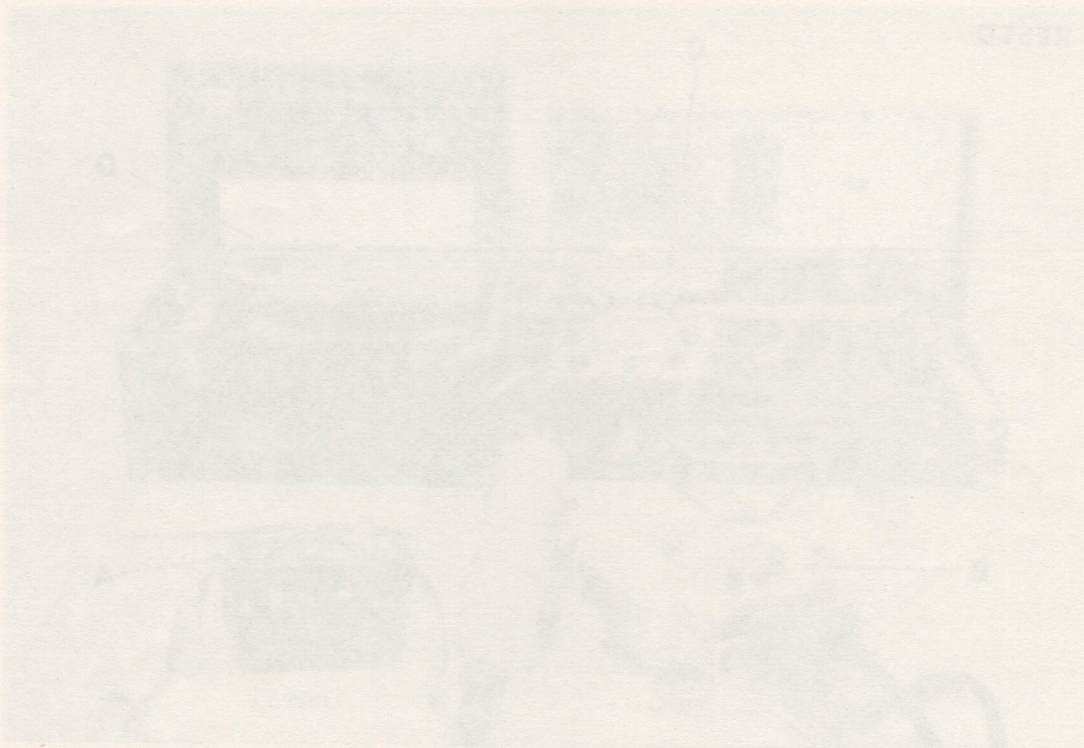


Fig. 9. Radiation Instruments - DP-62A, DP-3, DP-5A and DP-12

7. Missile Systems

This was probably the first conventional war involving large numbers of Anti-tank and Surface to Air Missiles (SAM). In addition it saw operational firings of the FROG 7 Free Flight Rocket System.

ATGW

Man Portable SAGGER



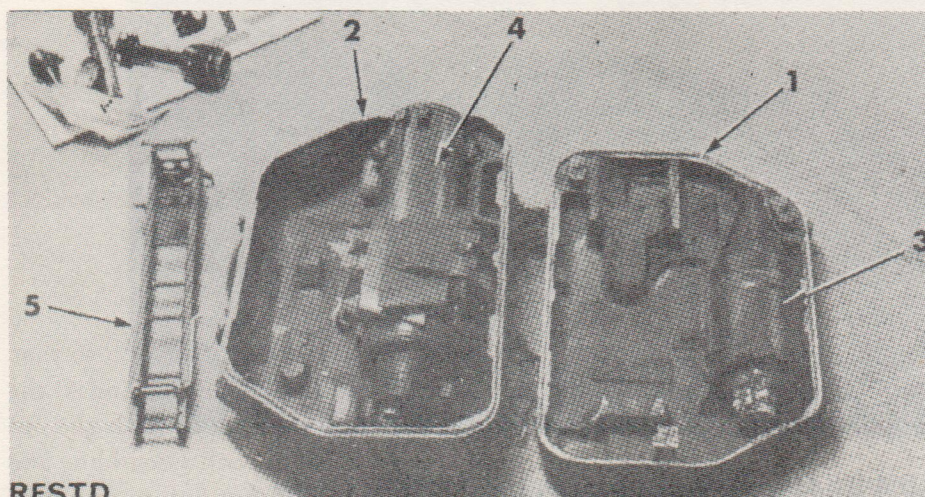
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Fig 1. Man Portable SAGGER

Egyptian infantry equipped with manportable SAGGER (Fig 1) operating from prepared defensive positions were widely reported in the Press to have taken a heavy toll of Israeli armour in the Sinai.

The manportable SAGGER ATGW system with a maximum range of 3000m and a minimum range of 500m employs line of sight command guidance over a wire link.

The SAGGER missile is 0.88m long, 120mm in diameter and weighs approximately 11.3kg.



- (1) Carrying Case lid
- (2) Carrying Case body
- (3) Warhead
- (4) Missile body
- (5) Launch rail

Fig 2. SAGGER in Carrying Case

RESTD.

The warhead section can be removed from the motor section by two quick release catches. This allows the missile to be stowed in a relatively small fibre glass case rather like a small suitcase (Fig 2). In fact an Israeli tank commander is reported to have said "We saw what we first thought were rocks and scrub bushes in the desert. As we came closer we realised that the objects were men with what looked like suitcases. Then they opened fire and we knew from our casualties that the suitcases were missiles".

The control unit is carried separately in a canvas back pack.

BRDM-2 SAGGER



Fig 3. BRDM-2 SAGGER

Both Arab armies were also equipped with the vehicle mounted version of SAGGER on BRDM-2 (Figs 3 and 4), the latest model of BRDM.

This system is based on a modified BRDM vehicle which retains its cross country and amphibious performance. Six SAGGER missiles are fitted on launch rails and a reserve of missiles is carried within the vehicle.



Fig 4. BRDM-2 SAGGER (Destroyed on the Northern Front)



Fig 5. BRDM Remote Control Unit

The missiles are fired by an operator inside the BRDM-2 or from a BRDM remote control unit (Fig 5), similar to the manportable control unit. This enables the missile to be fired from a point some 25-30m from the vehicle.

FROG 7

The FROG 7 (Fig 6) Free Flight Rocket System was reported to have been used on one occasion by the Syrians.



Fig 6. FROG 7 on ZIL-135

It is mounted on the wheeled ZIL-135 Chassis, has a maximum range of 65km and a minimum range of 15km.

SAM Systems

The Syrians and Egyptians had as their prime missile defence against Israeli aircraft the new Soviet SA-6 (GAINFUL) low to medium altitude SAM system, which was fired operationally for the first time in this war. In addition they had the older SA-2 (GUIDELINE) and SA-3 (GOA) (Figs 7 and 8) systems together with the manportable SA-7 (GRAIL) system.

A description of these systems with photographs was published in ATIR 104 dated October 1973.



Fig 7. Captured SA-3 (GOA) Missiles on their Launcher



Fig 8. Captured SA-3 Site inside Egypt near the West Bank of the Suez Canal

PART II**MOSCOW PARADE
NOVEMBER 1973****1. Armoured Fighting Vehicles****AMPHIBIOUS AIRBORNE COMBAT VEHICLE (BMD)**

When this vehicle appeared briefly on Exercise DVINA in October 1971 (Fig 1) it was given the provisional nomenclature Light Tank M-1970. Its true role remained somewhat of a mystery until its appearance on the Moscow parade on 7 November last year (Fig 2), when its Soviet designation, BOYEVAYA MASHINA DESANTNAYA, Combat Vehicle Air Assault or Airborne forces, was announced.

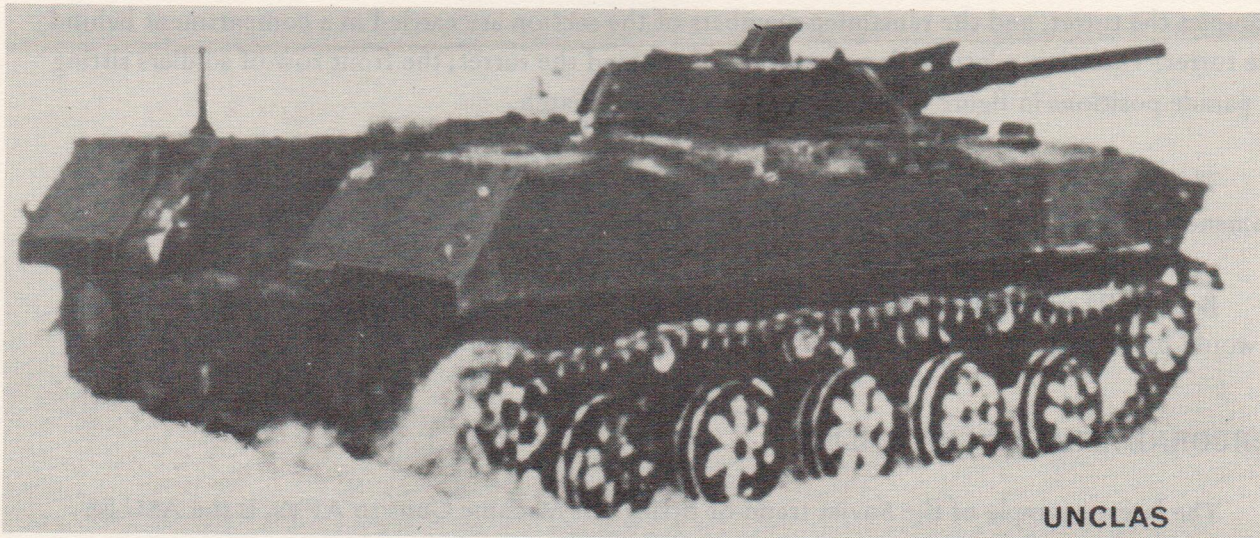


Fig 1. BMD on Exercise DVINA

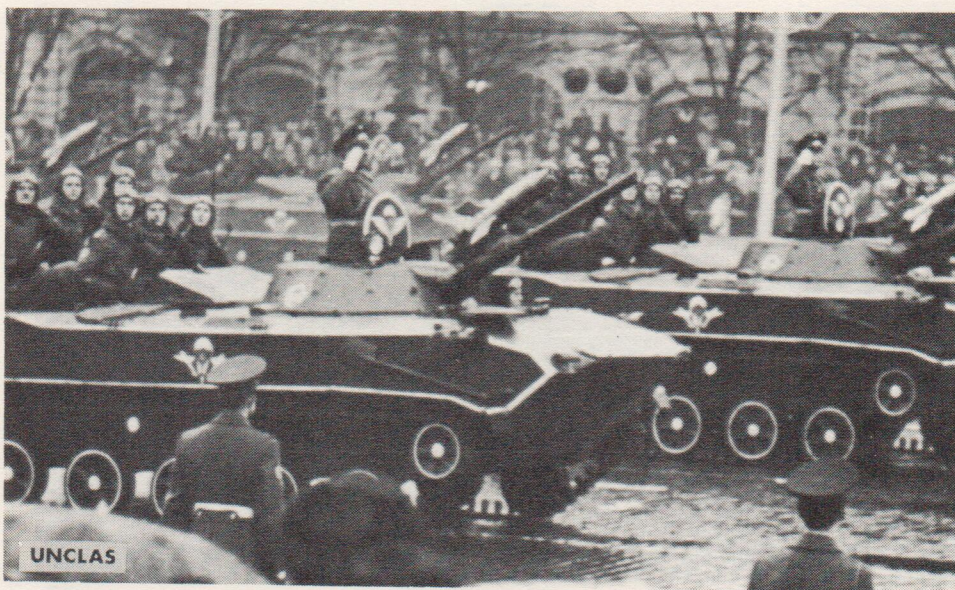


Fig 2. BMD on Moscow Parade 1973

The vehicle is approximately 5099mm (16.7ft) long, 2560mm (8.4ft) wide, 1829mm (6ft) high overall, and weighs between 8 and 9 tonnes. It is amphibious and is propelled through the water by two hydrojets at the rear.

The main armament and turret appear to be the same as BMP, which we now know to be a 73mm smooth bore gun with coaxial 7.62mm MG, with a SAGGER ATGW launching rail mounted above the gun. In addition there are two bow mounted 7.62mm MGs. The apertures for these guns are fairly large and the guns must have some traverse, but probably limited elevation.

We believe that the vehicle is intended to carry a crew of two, a driver and a gunner, and a full airborne section of seven. There are three positions forward of the turret; the driver is central with section members of each side of him, one of whom is probably the section commander. The gunner occupies the turret, and the remaining members of the section are carried in a compartment behind the turret. There is a relatively large access hatch behind the turret; the front row of soldiers sitting in parade positions in figure 2 have their legs inside this hatch.

This vehicle has so far only been seen with airborne markings and this together with its Soviet nomenclature suggests that it has been specifically designed for use by the Airborne forces.

Both BMD and BMP are capable of carrying out the role of the ageing PT-76, but at this stage it would be premature to label either as a replacement for this light tank.

AIRBORNE ASSAULT GUN ASU-85

The latest example of the Soviet trend of fitting AA Machine Guns to AFVs, is the ASU-85 (Fig 3), which appeared mounting the 12.7mm DShK AA HMG.



Fig 3. Airborne Assault Gun ASU-85

2. Guided Missiles

SWATTER ATGW on BRDM-2

Two versions of the SWATTER ATGW are known to exist. SWATTER 'A' was first seen in 1962 and a modified version SWATTER 'B' was first paraded in 1967. Both versions are mounted on the BRDM Armoured Reconnaissance Vehicle.

SWATTER 'B' has a blunter nose, longer flares, no side jets and a slightly different motor body section, indicating changes in the missile propulsion system.

The SWATTER missile is larger than SAGGER and is 1.13m long, 130mm in diameter and weighs about 26.5kg. It has a conventional HEAT warhead and is radio command guided.

SWATTER 'A' has a maximum range of 2500m and a minimum range of 600m. The modified SWATTER 'B' is considered to have an improved range.

The first appearance of SWATTER mounted on the latest BRDM-2 armoured reconnaissance vehicle in last year's Moscow Parade (Fig 1) removes any doubts that SWATTER is a current system. There had been some uncertainty, prior to this sighting, as to future Soviet intentions for the system, in view of its limited deployment compared with the SAGGER system.

Four SWATTER missiles are mounted in the BRDM-2, the basic vehicle being very similar to BRDM-2 SAGGER. The missiles appear to be normal SWATTER 'B' although there may be improvements of which we are unaware.



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